NXR Series Module Communication Protocol V1.47

目录

1. Overview

This protocol applies to Winline Technology NXR series charging module.

Baud rate: 125Kbps

2. Definition of Frame Format

2.1 Frame Format

A frame is the basic unit of transmitting information. CAN 2.0B frame format is shown in the following chart,

Field name	Code
Start of Frame	sof(1bit)
Arbitration Field	Identifier(11bit)
	SRR
	IDE
	Identifier (18bit)
	RTR
Control Field	reseal(2 bits)
	Data Len(4 bits)
Data Field	Data(8bytes)
CRC Field	CRC(2bits)
End of Frame	(7bits)

2.2 Frame Identifier - 29bits

28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	1	10	9	8	7	6	5	4	3	2	1	0
PROTNO (9 bits)									PTP	DSTADDR (8 bits)								SRCADDR (8 bits)								Group		

2.2.1 PROTNO

Default: PRONTO＝0x060

2.2.3 PTP

PTP=1，point to point communication;

PTP=0，broadcast communication;

2.2.4 DSTADDR

Destination address:

Power supply module address range: 00~63;

Monitor address is fixed to: 0xF0;

Broadcast address: 0xFF;

Group broadcast address: 0xFE

2.2.5 SRCADDR

Source address:

In all communications types, bit3~bit10 are used to indicate source address on the bus.

Power supply module address range: 00~63;

Monitor address is fixed to: 0xF0

2.2.6 Group

Group number of the module: 0~7

2.3 Data Field

2.3.1 Set module parameters

Used to set module voltage, current, current limit point, power on/off.

Transmit frame data field format			
Byte0	Byte1	Byte2~ Byte3	Byte4~ Byte7
Function code	Reserved	Register No.	Data
03	00	See **Chart 1**	Data to set（See Chart 1）

Example：Set module voltage

03	00	00 21	44 2F 00 00

0x442F0000 The corresponding floating point format data is: 700.0

Example: Set module current limit point

03	00	00 22	3F 00 00 00

0x3F000000 corresponding floating point format data is: 0.5(Module current limit point is set in percentage).

Current limit point corresponding to rate current is 1, other value are calculated proportionally.

Module current limit point calculating method: Assuming that the required current is 10A and the rated current is 20A, then the current limit point = 10/20 = 0.5

Example: Set module power on

03	00	00 30	00 00 00 00

Example: Set module power off

03	00	00 30	00 01 00 00

2.3.2 Read Module Data

Transmit frame data field format			
Byte0	Byte1	Byte2~ Byte3	Byte4~ Byte7
Function code	Reserved	Register No.	Reserved
10	00	See **Chart 1**	00 00 00 00

Respond frame data field format			
Byte0	Byte1	Byte2~ Byte3	Byte4~ Byte7
Data type of returned data	Error code	Register No.	Reserved
41:Float point 42:Integer	F0：Normal Others ： Fault, discard frame	See **Chart 1**	Returned data

Example：Get module voltage

Monitor sending：

10	00	00 01	00 00 00 00

Module responding：

41	F0	00 01	44 2F 00 00

0x41: Returned data is in float point format.

0xF0: Response frame is normal.

0x0001: Register number.

0x442F0000 corresponding floating point format data is: 700.0

Example: Get module status

Monitor sending：

10	00	00 40	00 00 00 00

Module responding：

42	F0	00 40	00 00 01 00

0x42: Returned data is in integer format.

0xF0: Response frame is normal.

0x0040: Register number.

0x00000100 See **Chart 2**

3. Attached Charts

3.1 Data Description Chart

Chapter 1

Register (VALUETYPE)	**Data Description** (RMP)	**Data Format**	**Format Description**
0x0001	Get module voltage	Float Point	
0x0002	Get module current	Float Point	
0x0003	Get module current limit point	Float Point	
0x0004	Get module DC board temperature	Float Point	

0x0005	Get module input phase voltage(DC input voltage)	Float Point	
0x0008	Get module PFCO voltage(positive half bus)	Float Point	
0x000A	Get module PFCO voltage(negative half bus)	Float Point	
0x000B	Get module panel(ambient) temperature	Float Point	
0x000C	Get module AC phase A voltage	Float Point	
0x000D	Get module AC phase B voltage	Float Point	
0x000E	Get module AC phase C voltage	Float Point	
0x0010	Get module PFC board temperature	Float Point	
0x0011	Get module rated output power	Float Point	
0x0012	Get module rated output current	Float Point	
0x0017	Set module working altitude	Integer	Unit：m; range: 1000~5000 No derating when altitude is below 1000m; if altitude is higher than 5000m, set 5000.Setting will be saved after power-off.
0x001B	Set module output current	Integer	Set value to output current*1024, for example: 10240 = 10A*1024
0x001E	Set group number	Integer	byte7 lower 3 bits（range 0~7） other bytes byte4~byte6 and byte7 higher 5 bits are 0s.
0x001F	Set module address assignation mode	Integer	0x00000000:Automatically assigned 0x00010000:set by DIP switch (default)
0x0021	Set module output voltage	Float Point	
0x0022	Set module current limit point	Float Point	

0x0023	Set module output voltage upper limit	Float Point	Set module output overvoltage point do not set unless specially required
0x0030	Power on/off	Integer	0x00010000:Power off ； 0x00000000:Power on
0x0031	Set module overvoltage reset	Integer	0x00000000:Disable;0x00010000:Reset
0x003E	Set module output overvoltage protection relevance permission	Integer	0x00000000:Enable; 0x00010000:Enable
0x0040	Get current alarm/status	Integer	**See Chart 2**
0x0043	Get DIP switch address	Integer	
0x0044	Set module short circuit reset	Integer	0x00000000：Disable;0x00010000:Reset
0x0046	Set module input mode	Integer	0x00000001：AC mode(defaule)；0x00000002：DC modes;
0x0048	Get input power	Integer	Unit 1W
0x004A	Get current set altitude	Integer	Unit: m(efault 1000)
0x004B	Get current module input working mode	Integer	0x00000001：Single phase AC; 0x00000002：DC; 0x00000003：Three phase AC; 0x00000005：Partten mismatch (phase sequence error);
0x0054	Get node Serial No low bytes(ID number)9	Integer	
0x0055	Get node Serial No high bytes(ID number)	Integer	
0x0056	Get DCDC version	Integer	Lower 16 bits of the returned data(byte6~byte7), version number refers to the decimal number of data.

0x0057	Get PFC version	Integer	Lower 16 bits of the returned data(byte6~byte7), version number refers to the decimal number of data.

3.2 Module Alarm/Status Chart

0 invalid 1 valid

Chart 2- Module Alarm/Status	
Bit	说明
0	Module fault (red indicator steady on)
1	Module protection (yellow indicator steady on)
2	Reserved
3	Module internal SCI communication failure
4	Input mode error(or input wiring error)
5	Input mode set by monitor does not match the actual working mode
6	Reserved
7	DCDC overvoltage
8	PFC voltage abnormal(imbalance, overvoltage or undervoltage)
9	AC overvoltage
10	Reserved
11	Reserved
12	Reserved
13	Reserved
14	AC undervoltage
15	Reserved
16	CAN communication failure
17	Module current imbalance
18	Reserved
19	Reserved
20	Reserved
21	Reserved
22	DCDC On/off status 0:On, 1:Off

23	Module power limiting
24	Temperature derating
25	AC power limiting
26	Reserved
27	Fan fault
28	DCDC short circuit
29	Reserved
30	DCDC over temperature
31	DCDC output overvoltage

4. Set Group Number, Address Command

Command to set group number and module address assignation mode is added. After successful setting, the group number and address assignation mode will be updated immediately and stored (with power off memory), and the ID in the returned data will be changed instantly to the latest group number.

Group number setting instructions:

There are two ways to set the group number: DIP switch and communication settings, respectively, corresponding to the automatic assignation mode and DIP switch setting address mode. When the module address assignation mode is selected as automatic, the DIP switch is used to set the group number. Under this circumstance, the communication group number setting function is invalid, and sending command will return a set failure response; only when the module address assignation mode is selected as DIP switch mode, the function of communication group number setting is effective!

Detailed setting steps are as follows:

Example：Set module group number to 5（0x05）

Set command(Data field):

03	00	00 1E	00 00 00 05

Replied command for successful setting:

42	F0	00 1E	00 00 00 05

Replied command for unsuccessful setting:

42	F2	00 1E	00 00 00 05

Set Module address assignation mode to DIP switch mode

Set command(Data field):

03	00	00 1F	00 01 00 00

Replied command for successful setting:

42	F0	00 1F	00 01 00 00

Replied command for unsuccessful setting:

42	F2	00 1F	00 01 00 00

5.Floating Point Data Description

Sequence of floating point number transmit: floating point number is stored in the format of four bytes, it is transmitted after converted to HEX-ASCII code. When transmitted, four bytes are send in the order of exponent and sign bit, mantissa higher bit, mantissa middle bit and mantissa lower bit. Floating point numbers are in IEEE 32-bit standard floating point number format(standard C floating point format) with a length of 32bits, as shown below,

D31	D30—D23	D22—D16	D15—D8	D7—D0
Floating point sign S	Exponent E	Mantissa Higher bits	Mantissa middle bits	Mantissa lower bits

IF the exponent is E and mantissa is M, Then the floating point number is $\pm (1+M\times 2^{-23}) \cdot 2^{E-127}$

Whether a floating point number is positive or negative depends on the sign bit S,

S=1 means the floating point number is negative; S=0 means the floating point number is positive.

For example, When 32-bit floating point numbers are 40H, A0H, 00H, 00H,which means S=0,E=129, M=2^{21}, then the floating point number is （$1+2^{21}\times2^{-23}$）·$2^{129-127}$= 5.0.

Given a floating point number 60, corresponding 4 bytes ASCII code is: 42, 70, 00, 00. Transmit order on the bus is 42, 70, 00, 00.

Given a floating point number 1.2, corresponding 4 bytes ASCII code is: 3f, 99, 99, 9a. Transmit order on the bus is 3f, 99, 99, 9a.

6. Input Voltage Mode

Module is compatible with DC input mode and AC input mode (three phase and single phase), the default mode is AC input mode, and monitor can set the input mode. If module input mode is set by monitor, the module needs to be powered off (all indicator on the panel are off) then powered on again before it can take effect.

In the AC input mode, the module can automatically identify single phase or three phase input. When the input power grid needs single-phase or three-phase switching, the module needs to be powered off (all indicator on the panel are off) and then power on again before it can take effect.

Input mode detection is executed in 2s after power up (starting with panel light). When there is a mismatch of detected input mode and the set input mode, the module will keep rechecking and cannot be started up normally. All three indicators on the panel are on and bit5 of alarm status bits is set. The user needs to confirm the actual input voltage type and get the currently set input mode (protocol no. 0x4B). If the input mode read is phase sequence error (or pattern mismatch), the monitor needs to set the correct input mode again or the input is needed to connected to the correct

power grid.

After the module completes the input voltage identification correctly, in the single phase ac input or dc input mode, if the spare phase is connected to voltage (current), the module will power off, all three indicators are on, and bit5 of alarm status bits is set. When voltage (current) applied to the spare phase voltage (current) is removed, the alarm disappears and the module returns to normal.

Detailed setting steps of input voltage mode are as follows:

Example: Set module to DC input mode

Set command (Data field):

03	00	00 46	00 00 00 02

Replied command for successful setting:

42	F0	00 46	00 00 00 02

Replied command for unsuccessful setting:

42	F2	00 46	00 00 00 02

Example: Set module to AC input mode

Set command (Data field):

03	00	00 46	00 00 00 01

Replied command for successful setting:

42	F0	00 46	00 00 00 01

Replied command for unsuccessful setting:

42	F2	00 46	00 00 00 01

7. Altitude Derating

When the module works in the high altitude area, current working altitude can be set by monitor. The effective setting range is 1000m ~5000m, and the module can conduct derating operation to different degrees according to the set altitude.

By principle, when the altitude is below 2000 meters, there is no need to set the altitude value; However, considering that the air duct may not be clear in long-term operation, when the working altitude of the module is higher than 1000 meters, it is suggested to set the actual altitude.

Example: Set module working altitude to 3000m

Set command(Data field):

03	00	00 17	00 00 0B B8

Replied command for successful setting:

42	F0	00 17	00 00 0B B8

Replied command for unsuccessful setting:

42	F2	00 17	00 00 0B B8